

8.2 EXERCISES

HOMEWORK KEY

WORKED-OUT SOLUTIONS
on p. WS1 for Exs. 9, 13, and 39
STANDARDIZED TEST PRACTICE
Exs. 2, 16, 29, 35, and 41

4 PRACTICE AND APPLY

Assignment Guide

Answer Transparencies
available for all exercises

Basic:

Day 1: EP p. 897 Exs. 35–40
pp. 518–521
Exs. 1–5, 9–19, 23–25, 38–41,
47–57 odd

Average:

Day 1: pp. 518–521
Exs. 1, 2, 5–7, 10–12, 14–16,
17–29 odd, 30–35, 38–43, 46, 50,
52, 56

Advanced:

Day 1: pp. 518–521
Exs. 1, 2, 7, 8, 10–12, 14–16,
20–28 even, 29–38*, 40–45*, 48,
54, 57

Block:

pp. 518–521
Exs. 1, 2, 5–7, 10–12, 14–16,
17–29 odd, 30–35, 38–43, 46, 50,
52, 56 (with 8.3)

Differentiated Instruction

See *Geometry Best Practices Toolkit*
for suggestions on addressing the
needs of a diverse classroom.

Homework Check

For a quick check of student under-
standing of key concepts, go over the
following exercises:

Basic: 4, 10, 14, 18, 38

Average: 6, 11, 15, 24, 40

Advanced: 8, 12, 16, 30, 41

Extra Practice

- Student Edition, p. 910
- Chapter 8 Resource Book:
Practice levels A, B, C, pp. 19–24

Practice Worksheet

An easily-readable reduced
practice page (with answers)
for this lesson can be found
on p. 504C.

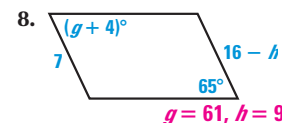
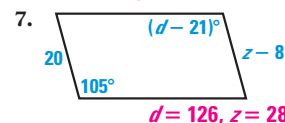
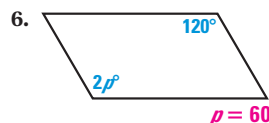
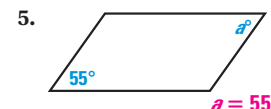
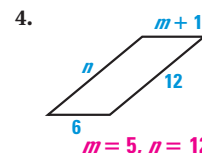
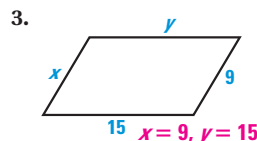
SKILL PRACTICE

- A** 1. **VOCABULARY** What property of a parallelogram is included in the definition of a parallelogram? What properties are described by the theorems in this lesson? **See margin.**

2. **★ WRITING** In parallelogram $ABCD$, $m\angle A = 65^\circ$. Explain how you would find the other angle measures of $\square ABCD$. **$m\angle B = 115^\circ$ since consecutive angles are supplementary and $m\angle C = 65^\circ$ and $m\angle D = 115^\circ$ since opposite angles are congruent.**

EXAMPLE 1
on p. 515
for Exs. 3–8

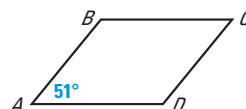
- xy ALGEBRA** Find the value of each variable in the parallelogram.



EXAMPLE 2
on p. 517
for Exs. 9–12

FINDING ANGLE MEASURES Find the measure of the indicated angle in the parallelogram.

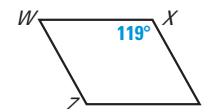
9. Find $m\angle B$. **129°**



10. Find $m\angle L$. **85°**



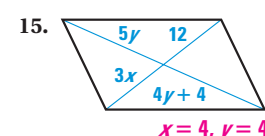
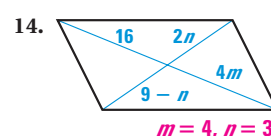
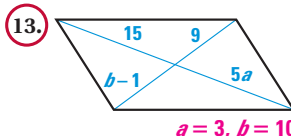
11. Find $m\angle Y$. **61°**



12. **SKETCHING** In $\square PQRS$, $m\angle R$ is 24 degrees more than $m\angle S$. Sketch $\square PQRS$. Find the measure of each interior angle. Then label each angle with its measure. **See margin for art; $m\angle S = 78^\circ, m\angle P = 102^\circ, m\angle Q = 78^\circ, m\angle R = 102^\circ$.**

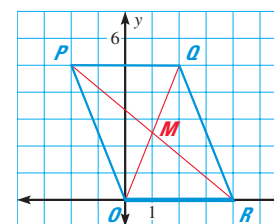
EXAMPLE 3
on p. 517
for Exs. 13–16

- xy ALGEBRA** Find the value of each variable in the parallelogram.

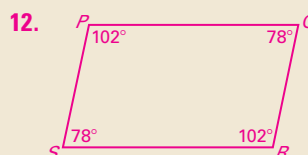


16. **★ MULTIPLE CHOICE** The diagonals of parallelogram $OPQR$ intersect at point M . What are the coordinates of point M ? **A**

- (A) $(1, \frac{5}{2})$ (B) $(2, \frac{5}{2})$
(C) $(1, \frac{3}{2})$ (D) $(2, \frac{3}{2})$

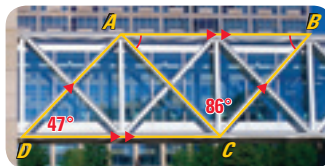


1. A parallelogram is a quadrilateral with both pairs of opposite sides parallel; opposite sides are congruent, opposite angles are congruent, consecutive angles are supplementary, and the diagonals bisect each other.



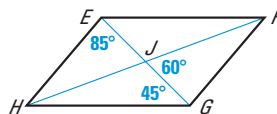
B REASONING Use the photo to copy and complete the statement. *Explain.* 17–22. See margin.

17. $\overline{AD} \cong$?
 18. $\angle DAB \cong$?
 19. $\angle BCA \cong$?
 20. $m\angle ABC =$?
 21. $m\angle CAB =$?
 22. $m\angle CAD =$?



USING A DIAGRAM Find the indicated measure in $\square EFGH$. *Explain.* 23–28. See margin.

23. $m\angle EJF$
 24. $m\angle EGF$
 25. $m\angle HFG$
 26. $m\angle GEF$
 27. $m\angle HGF$
 28. $m\angle EHG$

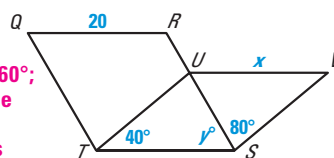


Animated Geometry at classzone.com

29. **★ MULTIPLE CHOICE** In parallelogram $ABCD$, $AB = 14$ inches and $BC = 20$ inches. What is the perimeter (in inches) of $\square ABCD$? **C**
 (A) 28 (B) 40 (C) 68 (D) 280
 30. **xy ALGEBRA** The measure of one interior angle of a parallelogram is 0.25 times the measure of another angle. Find the measure of each angle. **36°, 144°**
 31. **xy ALGEBRA** The measure of one interior angle of a parallelogram is 50 degrees more than 4 times the measure of another angle. Find the measure of each angle. **26°, 154°**

32. **ERROR ANALYSIS** In $\square ABCD$, $m\angle B = 50^\circ$. A student says that $m\angle A = 50^\circ$. *Explain* why this statement is incorrect. **$\angle B$ and $\angle A$ are consecutive angles and thus are supplementary which makes $m\angle A = 130^\circ$.**

33. **USING A DIAGRAM** In the diagram, $QRST$ and $STUV$ are parallelograms. Find the values of x and y . *Explain* your reasoning. **20, 60°; $UV = TS = QR$ using the fact that opposite sides are congruent and the Transitive Property of Equality. $\angle TUS \cong \angle VSU$ using the Alternate Interior Angles Congruence Theorem and $m\angle TSU = 60^\circ$ using the Triangle Sum Theorem.**

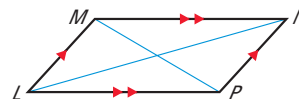


34. **FINDING A PERIMETER** The sides of $\square MNPQ$ are represented by the expressions below. Sketch $\square MNPQ$ and find its perimeter. **See margin for art; 52**

$$MQ = -2x + 37 \quad QP = y + 14 \quad NP = x - 5 \quad MN = 4y + 5$$

35. **★ SHORT RESPONSE** In $ABCD$, $m\angle B = 124^\circ$, $m\angle A = 66^\circ$, and $m\angle C = 124^\circ$. *Explain* why $ABCD$ cannot be a parallelogram. **In a parallelogram opposite angles are congruent. $\angle A$ and $\angle C$ are opposite angles but not congruent.**

- C** 36. **FINDING ANGLE MEASURES** In $\square LMNP$ shown at the right, $m\angle MLN = 32^\circ$, $m\angle NLP = (x^\circ)$, $m\angle MNP = 12x^\circ$, and $\angle MNP$ is an acute angle. Find $m\angle NLP$. **16°**



37. **CHALLENGE** Points $A(1, 2)$, $B(3, 6)$, and $C(6, 4)$ are three vertices of $\square ABCD$. Find the coordinates of each point that could be vertex D . Sketch each possible parallelogram in a separate coordinate plane. *Justify* your answers. **$(-2, 4)$, $(4, 0)$; see margin for art; in each quadrilateral each pair of opposite sides is parallel.**

17. \overline{BC} ; opposite sides of a parallelogram are congruent.
 18. $\angle BCD$; opposite angles of a parallelogram are congruent.
 19. $\angle DAC$; alternate interior angles are congruent.
 20. 47° ; opposite angles of a parallelogram are congruent.
 21. 47° ; consecutive angles of a parallelogram are supplementary and alternate interior angles are congruent.
 22. 86° ; alternate interior angles are congruent.

Avoiding Common Errors

Exercises 5–8 Students may treat opposite angles of the parallelogram as supplementary rather than congruent. Review Theorems 8.4 and 8.5. Also suggest that students inspect the diagrams carefully.



An **Animated Geometry** activity is available on-line for **Exercises 23–28**. This activity is also available on the **Power Presentations CD-ROM**.

Teaching Strategy

Exercises 23–28 Have students copy the diagram, and before they attempt to answer the exercises, have them use a second color to fill in the measures of all angles of the four smallest triangles.

Mathematical Reasoning

Exercises 30–31 Draw and label a parallelogram that shows the measures of the angles. Point out that the given angles must be consecutive angles since they are not congruent. Have the students write algebraic expressions for the angle measures before writing an equation.

23. 120° ; $\angle EJF$ and $\angle FJG$ are a linear pair.

24. 85° ; Alternate Interior Angles Theorem with $\angle HEG$

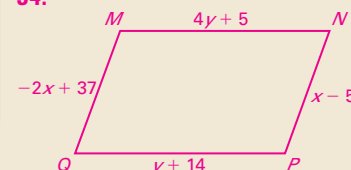
25. 35° ; Triangle Sum Theorem

26. 45° ; Alternate Interior Angles Theorem with $\angle HGE$

27. 130° ; sum of the measures of $\angle HGE$ and $\angle EGF$

28. 50° ; consecutive angles are supplementary, $\angle HGF$ and $\angle EHG$.

34.



37. See Additional Answers beginning on p. AA1.